

Conclusions and Implications

This study represents a comprehensive analysis of pricing behavior in the fresh orange, table grape, fresh apple, and fresh grapefruit markets. For specific varieties of each commodity, we investigate issues including the locus of price determination, the symmetry of price transmission, the degree of retail price fixity, and the apparent control over price by fruit retailers in both output and input markets. Our data for this analysis consist of 2 years (1998 and 1999) of weekly retail-scanner price and sales data from six major metropolitan markets in various regions throughout the country. Within each market, most major retail chains are represented in the data. At the shipper level, our data consist of shipping-point prices and volumes obtained from either the USDA, or individual commodity commissions. These data are supplemented with data from a variety of other sources to account for transportation costs, marketing costs, and variations in factors that are critical to the demand or supply of each commodity. At each stage of our analysis, we apply econometric modeling techniques to these data that are widely accepted and acknowledged as appropriate for the particular purpose. While we are confident in the accuracy of our findings, they are, of course, conditional on the market conditions that prevailed during our particular period of study.

In order to gain an understanding of the behavior of prices in each market, we first determine where prices are determined within the marketing channel of each commodity. The results are consistent across all commodities—shipping-point prices cause retail prices, so we can conclude that prices are formed at the shipper level for all of the fresh fruits considered here. We also investigate the symmetry with which price changes at the shipping point are transmitted to retail price changes. For all commodities, we find that retail prices respond more rapidly to shipping-point price increases than decreases, although this result was less significant for apples than for the other commodities. This result is commonly interpreted as evidence, albeit indirect, of retailers' ability to extract some surplus from shippers when prices are volatile.

Retail prices not only adjust after and more slowly than shipping point prices, but we find that they are virtually fixed on statistical grounds. To maintain fixed prices in the face of volatile buying prices, a key feature of category management, a produce retailer must have some ability to control retail prices. Indeed, Slade

(1999) shows that the extent of price fixity is likely to rise with strategic pricing behavior and shows that this is the case with store-level retail data. However, despite the fact that retail price fixity can cause losses at the grower level (Sexton et al.) due to imperfect transmission of price signals, it may also benefit the consumer due to greater price stability. Moreover, there are many explanations for fixed prices (menu costs, constant production costs, consumer search costs) that are entirely consistent with competitive behavior. Therefore, we require more conclusive evidence of imperfectly competitive pricing than this preliminary analysis provides. To that end, we develop a model of price determination at retail and wholesale that not only allows for a wide variety of retail and input-market pricing strategies, but also for explainable variations in supply and demand.

Specifically, our explanation for fresh fruit pricing is based on the logic of a "trigger-price" that has been shown to underpin cooperative agreements among 19th century railway companies, airlines in the 1990s, and present-day potato and beef processors. If tacit cooperative agreements exist among fresh fruit retailers who engage in day-to-day interaction in commodity and retail markets, then there must be some mechanism by which they are able to sustain the agreement among themselves to hold prices at a certain level. In the trigger-price model, this mechanism consists of a commonly understood price threshold. If an individual retailer believes that a rival is pricing below that threshold (above, in the input market) punishment ensues with a round of competitive pricing, often price discount meant to restore some market share lost to the cheating firm.

To determine whether this model is a good explanation for how prices are actually formed, we estimate a model that allows for separate regimes of cooperation and punishment and see if this does a better job of explaining the data than a simple, single-regime model. Applying this model to each of our commodities, we find evidence that these regimes do indeed exist and that pricing behavior within the cooperative regime may result in lower prices for growers and higher prices for consumers. However, these results vary considerably by commodity, market, and retail chain. For apples, we find evidence of both buyer and seller power that is both statistically and economically significant in virtually all market / chain pairs. For fresh grapes, we find a consistent pattern of output market power. Input market power is often statistically

significant, but inconsequential in magnitude. Given the importance of grape imports, it is tempting to suggest that import competition causes this result, but we consider only the U.S. production season, in which imports play a minor role.

Retail orange prices also appear to reflect a considerable degree of price setting ability, but as in the grape case, the use of buyer power is less consistent and of a lower magnitude in most markets. For grapefruit, we find an irregular pattern of buying power—statistically and economically significant in approximately 60 percent of the market-chain pairs, but insignificant in the remainder of cases. On the other hand, grapefruit sellers consistently exercise a moderate level of market power in retail markets. For all commodities, periods of collusion occur roughly two-thirds of the time, so any benefit consumers or shippers may receive from periodic price wars is likely to be short-lived and unpredictable.

We also find some evidence that the degree of pricing power—whether in input or output markets—falls with the amount of volume in the system. This finding is in stark contrast to previous research showing that buyers of more perishable produce commodities (i.e., lettuce) tend to secure a greater share of the grower-retailer margin in years of relatively large supply, but tend to offer growers more competitive prices when supplies are tight (Sexton and Zhang). We believe that our result is due to the fact that retailers use periodic promotions of semi-perishable commodities as a facili-

tating mechanism for their cooperative behavior. By publishing prices that demonstrate their willingness and ability to reduce profits of other sellers, retailers are able to establish effective trigger levels in the absence of a formal mechanism of explicit collusion. During these periodic promotions, retailers “cheat” on the collusive arrangement and tend to price relatively competitively, only to return to the collusive pricing level once discipline is restored in the market.

This conclusion is supported by our estimates in several ways. First, finding that punishment regimes occur anywhere between one-third to one-fifth of the time is consistent with the frequency of price promotions in retailers’ produce departments. Second, the fact that our statistical results show varying degrees of pricing power being exercised by different chains also supports this conclusion—some choose to behave as punishers while others tend to follow. Third, this result is also consistent with some retailers adopting an entirely different pricing strategy—instead of using the market power engendered by the collusive behavior to extract rents through the price mechanism, they choose instead to price competitively and then extract any rents through some other form of rent-shifting mechanism. However, a more complete study of this issue would compare estimates of retailer behavior, such as we do here, to measures of retail concentration using a longer time series data set that contains significant temporal and geographic variation in concentration.